

Honeywell Docket No. H0004019.68746 US - 4780
Buchalter Docket No.: H9931-7305

REMARKS

35 USC §112

Claim 7 is rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which application regards as the invention. The Applicant respectfully agrees and has amended claim 7 to include the provision of 10% and not 13%, which is clearly a typographical error based on the specification.

35 USC §103

Claims 1-15 are rejected under 35 USC §103(a) as being unpatentable over Gnade (EP 0687004). The Applicants respectfully disagree.

Claim 1 of the present application recites:

1. A multilayered dielectric structure which comprises:
a porous dielectric layer which has a porosity of about 10% or more;
an adhesion promoting dielectric layer on the porous dielectric layer which has a porosity of about 10% or less; and
a substantially nonporous capping layer on the adhesion promoting dielectric layer.

First, it should be pointed out that the Examiner's concern over claim 7 and the perceived 13% upper range for the porosity of the adhesion promoting dielectric layer is misplaced, in that this original number is clearly a typographical error, especially in view of the specification, which always cites an upper limit of 10%.

Second, the Examiner suggests that unless the Applicants can provide a reason as to why the provision of 10% is an important provision, that it would be obvious to use experimentation to arrive at other porosities – despite not being disclosed, taught or suggested by Gnade. The Applicants herein point to paragraph [0079] in the current specification/publication, which states that the adhesion promoting dielectric layer is considered to act as a stress buffer. One of ordinary skill in the art of porous dielectrics would understand that to mean that a certain level of porosity is not suitable, because beyond that level of porosity – a material becomes easily breakable and damaged. In addition, if the layer is designed to be “adhesion promoting” – then it would make sense that the greater surface area of the adhesion promoting layer that is in direct contact with the other layers would be logical.

A highly porous layer of material will not be in contact with surrounding layers to the same degree as a lower porosity layer. The Gnade reference, by suggesting a layer that comprises 15-50% porosity is clearly not considering this layer to be a) a stress buffer and b) an adhesion promoter.

Therefore, claim 1 is allowable as patentable over Gnade, since Gnade does not patentability of claim 1. In addition, claims 2-15 are allowable as patentable over Gnade by virtue of their dependency on claim 1.

Claims 16-21 are rejected under 35 USC §103(a) as being unpatentable over Gnade (EP 0687004) in view of Gallagher et al. The Applicants respectfully disagree.

Claim 16 of the present application recites:

16. A method for forming a multilayered dielectric structure comprising:

coating a substrate with a first composition comprising a pre-polymer, solvent, optional catalyst, and a porogen to form a film, cross-linking the composition to produce a gelled film, and heating the gelled film at a temperature and for a duration effective to remove substantially all of said porogen to produce a porous dielectric layer which has a porosity of about 10% or more;

coating the porous dielectric layer with a second composition comprising a silicon containing pre-polymer, solvent, and optional catalyst; followed by cross-linking and heating to produce an adhesion promoting dielectric layer on the porous dielectric layer which has a porosity of about 10% or less; and

forming a substantially nonporous capping layer on the adhesion promoting dielectric layer.

First, it should be pointed out that the Examiner's concern over claim 7 and the perceived 13% upper range for the porosity of the adhesion promoting dielectric layer is misplaced, in that this original number is clearly a typographical error, especially in view of the specification, which always cites an upper limit of 10%.

Second, the Examiner suggests that unless the Applicants can provide a reason as to why the provision of 10% is an important provision, that it would be obvious to use experimentation to arrive at other porosities – despite not being disclosed, taught or suggested by Gnade. The Applicants herein point to paragraph [0079] in the current specification/publication, which states that the adhesion promoting dielectric layer is considered to act as a stress buffer. One of ordinary skill in the art of porous dielectrics would understand that to mean that a certain level of porosity is not suitable, because beyond that level of porosity – a material becomes easily breakable and damaged. In addition, if the layer is designed to be “adhesion promoting” – then it would make sense that the greater surface area of the adhesion promoting layer that is in direct contact with the other layers would be logical. A highly porous layer of material will not be in contact with surrounding layers to the same degree as a lower porosity layer. The Gnade reference, by suggesting a layer that comprises 15-50% porosity is clearly not considering this layer to be a) a stress buffer and b) an adhesion promoter.

The Applicants believe that the Examiner has missed a key point of the Gallagher reference. The Examiner points to Column 11, lines 49-51 to show that Gallagher anticipates utilizing a relatively non-porous dielectric layer (B-stage dielectric matrix) on top of a porous dielectric layer. The Examiner has clearly glossed over the fact that in the previous paragraph in Column 11, specifically lines 6-36, Gallagher teaches that a metal layer, seed layer or barrier layer must be applied on top of the porous dielectric layer, before any additional layers are applied. It's the essence of the Gallagher invention. Once the metal layer, seed layer or

barrier layer is applied, both the porous layer and other layer are treated to remove some of the porogen from the porous dielectric layer. It is only after that point when an additional layer is applied, such as another dielectric layer. These metal layers, barrier layers and seed layers are specifically – by definition – designed to keep an additional layer from migrating into the layer below the metal layer, barrier layer or seed layer. In addition, the Gallagher reference specifically teaches against adding a cap layer throughout the reference and specifically in Column 11, lines 37 and 38, when Gallagher states: “Further, the elimination of an added cap layer provides a porous dielectric material layer having a rough surface.”

In claim 16 of the present application, a method is recited wherein a porous dielectric layer is adhered to a cap layer via an intermediate adhesion promoting dielectric layer. It is clear from the specification that the adhesion promoting layer is applied directly to the underlying porous dielectric layer, especially given the statement on page 25, lines 17-20: “Preferably the coating of the adhesion promoting dielectric layer onto the porous dielectric layer results in an infiltration of the adhesion promoting layer into the porous dielectric layer of about 300 angstroms or less.” This infiltration of the adhesion promoting layer into the porous dielectric layer would be virtually impossible if there was a metal layer, barrier layer or seed layer between the two by virtue of the very nature of these types of barrier layers. One of ordinary skill in the art of semiconductor chemistry would not read the Gallagher reference and understand it to mean that the metal layer, barrier layer or seed layer can be removed in order to apply an adhesion promoting layer to a porous dielectric layer.

In addition, claim 16 recites a substantially nonporous cap layer applied to the adhesion promoting layer. The Gallagher reference specifically teaches against using a cap layer, because the Gallagher invention is designed to eliminate the need of a cap layer. One of ordinary skill in the art would not read the Gallagher reference, after specifically stating that one of the goals of the invention is to eliminate the need for a capping layer, and understand it to mean that a substantially non-porous capping layer can be applied to the layered material.

Therefore, claim 16 is allowable as patentable over Gnade in view of Gallagher, since the combination of Gnade with Gallagher does not patentability of claim 1. In addition, claims

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17-21 are allowable as patentable over the combination of Gnade with Gallagher by virtue of their dependency on claim 16.

REQUEST FOR A TELECONFERENCE

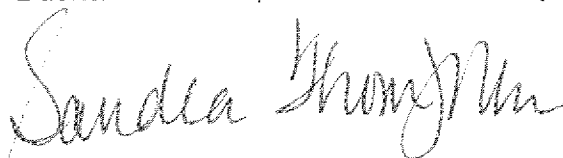
The Applicants, through the undersigned Attorney-of-Record, respectfully request a teleconference/interview with the Examiner, if this application is not placed in condition for allowance with this Response. Dr. Thompson is generally available Monday-Friday from 8AM to 4PM PST at 949-224-6282 and on Fridays – all day – at 949-702-4448.

REQUEST FOR ALLOWANCE

Claims 1-23 are pending in this application, and the Applicant respectfully requests that the Examiner reconsider all of the claims in light of the arguments presented and allow all current and pending claims. The Applicant appreciates the Examiner's thorough review of this application, along with presenting claims 22-23 as allowable; however, the Applicants respectfully request that the Examiner reconsider the rejections on claims 1-21.

Respectfully submitted,

Buchalter Nemer, A Professional Corporation



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